

Serial Number: Continuation of 09/939,261

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Title: Multiple Reflector Solar Concentrator Systems

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Amended Claim Sets

MARKED SET WITH AMENDMENTS

[Amended] 1. A light energy trough concentrator comprising:

- a) a primary reflector having a linear concave configuration defining a first focal zone, and having a first longitudinal axis;
- b) a secondary reflector having a linear convex configuration and a non-convex face defining a second focal zone and having a second longitudinal axis in parallel alignment with the first longitudinal axis, the secondary reflector being disposed within the first focal zone; and
- c) a tertiary reflector having a linear non-imaging configuration defining a third focal zone and having a third longitudinal axis in parallel alignment with the first and second longitudinal axes, the tertiary reflector being disposed within the second focal zone, said third focal zone being disposed within the volume defined by the tertiary reflector;

wherein light energy reflecting from the primary reflector [can be] is directed first to the secondary reflector, next to the tertiary reflector, and finally into the third focal zone.

2. The light energy concentrator of Claim 1 wherein the primary reflector has a parabolic configuration and the secondary reflector has a hyperbolic configuration.

3. The light energy concentrator of Claim 1 wherein the secondary reflector and tertiary reflectors are shaped and disposed so as to reflect into the third focal zone at least 75% of the light energy being reflected from the primary reflector.

4. The light energy concentrator of Claim 1 wherein the primary reflector has a circular arcuate configuration.

5. The light energy concentrator of Claim 1 also comprising a non-imaging quaternary reflector defining a fourth focal zone and having a fourth longitudinal axis in parallel alignment with the second longitudinal axis, the quaternary reflector being disposed on the non-convex face of the secondary reflector.

6. The light energy concentrator of Claim 1 wherein the secondary reflector is selective, allowing a portion of light energy from the primary reflector to pass through and a photovoltaic device is disposed so as to receive such pass through light energy.

[Amended] 7. The light energy concentrator of Claim 6 wherein the light energy passed through is in a spectral range of substantial efficiency for the photovoltaic device to operate.

[Amended] 8. The light energy concentrator of Claim 6 wherein the light energy passed through is in the [near] infrared range of the solar spectrum.

[Amended] 17. A light energy dish concentrator comprising:

- a) a primary reflector having a circular concave configuration defining a first focal zone and having a first longitudinal axis;
- b) a secondary reflector having a circular convex configuration and a non-convex face defining a second focal zone, the secondary reflector being disposed within the first focal zone; and
- c) a tertiary reflector having a circular non-imaging configuration defining a third focal zone, the tertiary reflector being disposed within the second focal zone, said third focal zone being disposed within the volume defined by the tertiary reflector;

wherein light energy reflecting from the primary reflector [can be] is directed first to the secondary reflector, next to the tertiary reflector, and finally into the third focal zone.

18. The light energy concentrator of Claim 17 wherein the primary reflector has a parabolic configuration and the secondary reflector has a hyperbolic configuration.

19. The light energy concentrator of Claim 17 wherein the secondary reflector and tertiary reflectors are shaped and disposed so as to reflect into the third focal zone at least 75% of the light energy being reflected from the primary reflector.

20. The light energy concentrator of Claim 17 wherein the primary reflector has a circular arcuate configuration.

21. A light energy concentrating system comprising the light energy dish concentrator of Claim 17 and a means for tracking the diurnal movement of the sun attached to the dish concentrator.

[Amended] 22. The light energy concentrating system of Claim 21 also comprising a means for transducing light energy collected in the third focal zone.

[Amended] 23. The light energy concentrating system of Claim [21] 22 wherein the energy transducer means is a heat engine.

24. The light energy concentrating system of Claim 21 also comprising a receiver disposed within the third focal zone and a means for transferring thermal energy from the receiver.

[Amended] 25. The light energy concentrating system of Claim 24 comprising a plurality of dish concentrators and a means for connecting the individual thermal energy transfer means of each dish concentrator.

UNMARKED SET WITH AMENDMENTS

[Amended] 1. A light energy trough concentrator comprising:

- a) a primary reflector having a linear concave configuration defining a first focal zone, and having a first longitudinal axis;
- b) a secondary reflector having a linear convex configuration and a non-convex face defining a second focal zone and having a second longitudinal axis in parallel alignment with the first longitudinal axis, the secondary reflector being disposed within the first focal zone; and
- c) a tertiary reflector having a linear non-imaging configuration defining a third focal zone and having a third longitudinal axis in parallel alignment with the first and second longitudinal axes, the tertiary reflector being disposed within the second focal zone, said third focal zone being disposed within the volume defined by the tertiary reflector;

wherein light energy reflecting from the primary reflector is directed first to the secondary reflector, next to the tertiary reflector, and finally into the third focal zone.

2. The light energy concentrator of Claim 1 wherein the primary reflector has a parabolic configuration and the secondary reflector has a hyperbolic configuration.

3. The light energy concentrator of Claim 1 wherein the secondary reflector and tertiary reflectors are shaped and disposed so as to reflect into the third focal zone at least 75% of the light energy being reflected from the primary reflector.

4. The light energy concentrator of Claim 1 wherein the primary reflector has a circular arcuate configuration.

5. The light energy concentrator of Claim 1 also comprising a non-imaging quaternary reflector defining a fourth focal zone and having a fourth longitudinal axis in parallel alignment with the second longitudinal axis, the quaternary reflector being disposed on the non-convex face of the secondary reflector.

6. The light energy concentrator of Claim 1 wherein the secondary reflector is selective, allowing a portion of light energy from the primary reflector to pass through and a photovoltaic device is disposed so as to receive such pass through light energy.

[Amended] 7. The light energy concentrator of Claim 6 wherein the light energy passed through is in a spectral range of substantial efficiency for the photovoltaic device to operate.

[Amended] 8. The light energy concentrator of Claim 6 wherein the light energy passed through is in the infrared range of the solar spectrum.

9. A light energy concentrating system comprising the light energy concentrator of Claim 1 and a first linear receiver disposed within the third focal zone, along the third longitudinal axis.

[Amended] 10. The light energy concentrating system of Claim 9 wherein water is passed through the first linear receiver to create steam.

11. The light energy concentrating system of Claim 9 also comprising a means for rotating the light energy concentrator to track diurnal solar movement.

[Amended] 12. The light energy concentrating system of Claim 11 wherein the first linear receiver does not move.

[Amended] 13. The light energy concentrating system of Claim 9 also comprising a non-imaging quaternary reflector defining a fourth focal zone and having a fourth longitudinal axis in parallel alignment with the second longitudinal axis, the quaternary reflector being disposed on the non-convex face of the secondary reflector and a second linear receiver disposed within the fourth focal zone, along the fourth longitudinal axis.

[Amended] 14. The light energy concentrating system of Claim 9 also comprising a second linear receiver disposed in a conductive relationship with the non-convex side of the secondary reflector.

15. The light energy concentrating system of Claim 14 wherein the second receiver preheats a fluid passing through the first receiver.

16. A light energy concentrating system comprising the solar energy concentrator of Claim 65 and a first linear receiver disposed within the third focal zone, along the third longitudinal axis.

[Amended] 17. A light energy dish concentrator comprising:

- d) a primary reflector having a circular concave configuration defining a first focal zone and having a first longitudinal axis;
 - e) a secondary reflector having a circular convex configuration defining a second focal zone, the secondary reflector being disposed within the first focal zone; and
 - f) a tertiary reflector having a circular non-imaging configuration defining a third focal zone, the tertiary reflector being disposed within the second focal zone, said third focal zone being disposed within the volume defined by the tertiary reflector;
- wherein light energy reflecting from the primary reflector is directed first to the secondary reflector, next to the tertiary reflector, and finally into the third focal zone.

18. The light energy concentrator of Claim 17 wherein the primary reflector has a parabolic configuration and the secondary reflector has a hyperbolic configuration.

19. The light energy concentrator of Claim 17 wherein the secondary reflector and tertiary reflectors are shaped and disposed so as to reflect into the third focal zone at least 75% of the light energy being reflected from the primary reflector.

20. The light energy concentrator of Claim 17 wherein the primary reflector has a circular arcuate configuration.

21. A light energy concentrating system comprising the light energy dish concentrator of Claim 17 and a means for tracking the diurnal movement of the sun attached to the dish concentrator.

[Amended] 22. The light energy concentrating system of Claim 21 also comprising a means for transducing light energy collected in the third focal zone.

[Amended] 23. The light energy concentrating system of Claim 22 wherein the energy transducer means is a heat engine.

24. The light energy concentrating system of Claim 21 also comprising a receiver disposed within the third focal zone and a means for transferring thermal energy from the receiver.

[Amended] 25. The light energy concentrating system of Claim 24 comprising a plurality of dish concentrators and a means for connecting the individual thermal energy transfer means of each dish concentrator.